CLAIMS

1. For distilling a liquid, an evaporator-and-condenser unit comprising:

A) a heat exchanger that includes heat-transfer surfaces, forming at least one condensation chamber and at least one evaporation chamber, by which heat passes from the condensation chamber to the heat exchanger;

B) an evaporation-chamber irrigation system whose rate of irrigation of each said evaporation chamber has a respective average irrigation rate and repeatedly reaches a respective peak irrigation rate that is at least twice the average irrigation rate thereof; and

C) a vapor guide defining a vapor path along which it directs to the at least one condensation chamber vapor thereby produced in the at least one evaporation chamber.

2. An evaporator-and-condenser unit as defined in claim 1 wherein each evaporation chamber's irrigation rate reaches its peak irrigation rate periodically.

3. An evaporator-and-condenser unit as defined in claim 1 further including a compressor so interposed in the vapor path as to make the vapor pressure in the at least one condensation chamber exceed that in the at least one evaporation chamber.

4. An evaporator-and-condenser unit as defined in claim 3 wherein each evaporation chamber's irrigation rate reaches its peak irrigation rate periodically.

5. An evaporator-and-condenser unit as defined in claim 1 wherein the irrigation system includes:

A) a main sprayer system that irrigates each said evaporation chamber for at least the majority of the time; and

B) an auxiliary sprayer system that irrigates each said at least one evaporation chamber for only a minority of the time, the rate at which each said evaporation chamber is irrigated while the auxiliary sprayer system is irrigating it being at least twice the average irrigation rate thereof.

6. An evaporator-and-condenser unit as defined in claim 5 wherein:

A) the evaporator-and-condenser unit includes a plurality of said evaporation chambers;

B) the auxiliary sprayer system includes at least one auxiliary-system nozzle, associated with a plurality of said evaporation chambers, from which the auxiliary sprayer system produces an auxiliary-system spray; and

C) for each of the evaporation chambers with which the auxiliary-system nozzle is associated, the auxiliary-system nozzle executes reciprocation between positions in which the auxiliary-system spray irrigates that evaporation chamber and positions in which the auxiliary-system spray does not irrigate that evaporation chamber.

7. An evaporator-and-condenser unit as defined in claim 6 further including a compressor so interposed in the vapor path as to make the vapor pressure in the at least one condensation chamber exceed that in the at least one evaporation chamber.

8. An evaporator-and-condenser unit as defined in claim 5 wherein the auxiliary sprayer system includes a plurality of auxiliary-system nozzles from which the auxiliary sprayer system produces an auxiliary-system spray by which the auxiliary sprayer system irrigates the at least one evaporation chamber.

9. An evaporator-and-condenser unit as defined in claim 5 wherein the main sprayer system includes a plurality of main-system nozzles from which the main

sprayer system produces a main-system spray by which the main sprayer system irrigates the at least one evaporation chamber.

10. An evaporator-and-condenser unit as defined in claim 5 further including a compressor so interposed in the vapor path as to make the vapor pressure in the at least one condensation chamber exceed that in the at least one evaporation chamber.

11. An evaporator-and-condenser unit as defined in claim 1 wherein the heat exchanger is a rotary heat exchanger in which the heat-transfer surfaces are mounted for rotation about a central cavity from which the irrigation system irrigates the evaporation chambers.

12. An evaporator-and-condenser unit as defined in claim 11 further including a compressor so interposed in the vapor path as to make the vapor pressure in the at least one condensation chamber exceed that in the at least one evaporation chamber.

13. An evaporator-and-condenser unit as defined in claim 11 wherein the irrigation system includes:

A) a main sprayer system that irrigates each said evaporation chamber for at least the majority of the time; and

B) an auxiliary sprayer system that irrigates each said at least one evaporation chamber for only a minority of the time, the rate at which each said evaporation chamber is irrigated while the auxiliary sprayer system is irrigating it being at least twice the average irrigation rate thereof.

14. An evaporator-and-condenser unit as defined in claim 13 further including a compressor so interposed in the vapor path as to make the vapor pressure in

the at least one condensation chamber exceed that in the at least one evaporation chamber.

15. An evaporator-and-condenser unit as defined in claim 13 wherein:

A) the evaporator-and-condenser unit includes a plurality of said evaporation chambers;

B) the auxiliary sprayer system includes at least one auxiliary-system nozzle, associated with a plurality of said evaporation chambers, from which the auxiliary sprayer system produces an auxiliary-system spray; and

C) for each of the evaporation chambers with which the auxiliary-system nozzle is associated, the auxiliary-system nozzle executes reciprocation between positions in which the auxiliary-system spray irrigates that evaporation chamber and positions in which the auxiliary-system spray does not irrigate that evaporation chamber.

16. An evaporator-and-condenser unit as defined in claim 15 further including a compressor so interposed in the vapor path as to make the vapor pressure in the at least one condensation chamber exceed that in the at least one evaporation chamber.

17. An evaporator-and-condenser unit as defined in claim 1 wherein:

A) the peak irrigation rate for each evaporation chamber exceeds the steady-state rate required to keep the heat-transfer surfaces thereof wetted; and

B) the average irrigation rate for each evaporation chamber is no more than half the steady-state rate required to keep the heat-transfer surfaces of that evaporation chamber wetted.

18. An evaporator-and-condenser unit as defined in claim 17 wherein each evaporation chamber's irrigation rate reaches its peak irrigation rate periodically.

19. An evaporator-and-condenser unit as defined in claim 17 further including a compressor so interposed in the vapor path as to make the vapor pressure in the at least one condensation chamber exceed that in the at least one evaporation chamber.

20. An evaporator-and-condenser unit as defined in claim 17 wherein the irrigation system includes:

A) a main sprayer system that irrigates each said evaporation chamber for at least the majority of the time; and

B) an auxiliary sprayer system that irrigates each said at least one evaporation chamber for only a minority of the time, the rate at which each said evaporation chamber is irrigated while the auxiliary sprayer system is irrigating it being at least twice the average irrigation rate thereof.

21. An evaporator-and-condenser unit as defined in claim 20 further including a compressor so interposed in the vapor path as to make the vapor pressure in the at least one condensation chamber exceed that in the at least one evaporation chamber.

22. An evaporator-and-condenser unit as defined in claim 20 wherein:

A) the evaporator-and-condenser unit includes a plurality of said evaporation chambers;

B) the auxiliary sprayer system includes at least one auxiliary-system nozzle, associated with a plurality of said evaporation chambers, from which the auxiliary sprayer system produces an auxiliary-system spray; and

C) for each of the evaporation chambers with which the auxiliary-system nozzle is associated, the auxiliary-system nozzle executes reciprocation between positions in which the auxiliary-system spray

irrigates that evaporation chamber and positions in which the auxiliary-system spray does not irrigate that evaporation chamber.

23. An evaporator-and-condenser unit as defined in claim 22 further including a compressor so interposed in the vapor path as to make the vapor pressure in the at least one condensation chamber exceed that in the at least one evaporation chamber.

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24. An evaporator-and-condenser unit as defined in claim 17 wherein the heat exchanger is a rotary heat exchanger in which the heat-transfer surfaces are mounted for rotation about a central cavity from which the irrigation system irrigates the evaporation chambers.

25. An evaporator-and-condenser unit as defined in claim 24 further including a compressor so interposed in the vapor path as to make the vapor pressure in the at least one condensation chamber exceed that in the at least one evaporation chamber.

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26. An evaporator-and-condenser unit as defined in claim 24 wherein the irrigation system includes:

A) a main sprayer system that irrigates each said evaporation chamber for at least the majority of the time; and

B) an auxiliary sprayer system that irrigates each said at least one evaporation chamber for only a minority of the time, the rate at which each said evaporation chamber is irrigated while the auxiliary sprayer system is irrigating it being at least twice the average irrigation rate thereof.

27. An evaporator-and-condenser unit as defined in claim 26 further including a compressor so interposed in the vapor path as to make the vapor pressure in

the at least one condensation chamber exceed that in the at least one evaporation chamber.

28. An evaporator-and-condenser unit as defined in claim 26 wherein:

A) the evaporator-and-condenser unit includes a plurality of said evaporation chambers;

B) the auxiliary sprayer system includes at least one auxiliary-system nozzle, associated with a plurality of said evaporation chambers, from which the auxiliary sprayer system produces an auxiliary-system spray; and

C) for each of the evaporation chambers with which the auxiliary-system nozzle is associated, the auxiliary-system nozzle executes reciprocation between positions in which the auxiliary-system spray irrigates that evaporation chamber and positions in which the auxiliary-system spray does not irrigate that evaporation chamber.

29. An evaporator-and-condenser unit as defined in claim 28 further including a compressor so interposed in the vapor path as to make the vapor pressure in the at least one condensation chamber exceed that in the at least one evaporation chamber.

30. For generating vapor from a liquid, a method comprising:

A) providing a heat exchanger that includes heat-transfer surfaces, forming at least one condensation chamber and at least one evaporation chamber, by which heat passes from the condensation chamber to the heat exchanger;

B) irrigating each said evaporation chamber at a respective irrigation rate that has a respective average irrigation rate and so varies as repeatedly to reach a respective peak irrigation rate that is at least twice the respective average irrigation rate; and

C) directing into the at least one condensation chamber vapor thereby produced in the at least one evaporation chamber.

31. A method as defined in claim 30 wherein each evaporation chamber's irrigation rate reaches its peak irrigation rate periodically.

32. A method as defined in claim 30 wherein the method further includes so compressing vapor in the vapor path as to make the vapor pressure in the at least one condensation chamber exceed that in the at least one evaporation chamber.

33. A method as defined in claim 32 wherein each evaporation chamber's irrigation rate reaches its peak irrigation rate periodically.

34. A method as defined in claim 30 wherein:

A) the peak irrigation rate for each evaporation chamber exceeds the steady-state rate required to keep the heat-transfer surfaces thereof wetted; and

B) the average irrigation rate for each evaporation chamber is no more than half the steady-state rate required to keep the heat-transfer surfaces of that evaporation chamber wetted.

35. A method as defined in claim 34 wherein each evaporation chamber's irrigation rate reaches its peak irrigation rate periodically.

36. A method as defined in claim 34 wherein the method further includes so compressing vapor in the vapor path as to make the vapor pressure in the at least one condensation chamber exceed that in the at least one evaporation chamber.

37. A method as defined in claim 36 wherein each evaporation chamber's irrigation rate reaches its peak irrigation rate periodically.